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Ostrich-Like Strategies in Sahelian Sands? Land and Water Grabbing in the Office du Niger, Mali

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ABSTRACT: In recent years, large-scale agricultural investment projects have increased in sub-Saharan Africa as a result of the growing appetites of local and international investors for land resources. Research has so far mainly focused on land issues, but the water implications of these land deals are starting to surface. Taking the Office du Niger (ON), in Mali, as a case study, we show that while around 100,000 ha is currently being cultivated, mostly by smallholders, a total of 600,000 ha of land has been allocated in the past ten years to investors in large-scale farming. This process has largely bypassed the official procedure established by the ON at regional level. The allocation of new lands has shifted to the national level, with an attempt to recentralize the management of land deals and associated benefits at the highest level, despite contrary efforts by foreign donors to strengthen the ON. This article describes the complex allocation process based on 'behind-closed-doors' negotiations. It then analyses the implications of the land deals on water issues by focusing on the strategies of actors to limit the risk of future water shortages, the current and expected difficulties in water management and allocation, and the emerging spatial and social redistribution of benefits and risk that signals a process of water grabbing.

KEYWORDS: Land grabbing, water management, irrigation scheme, Office du Niger, Mali

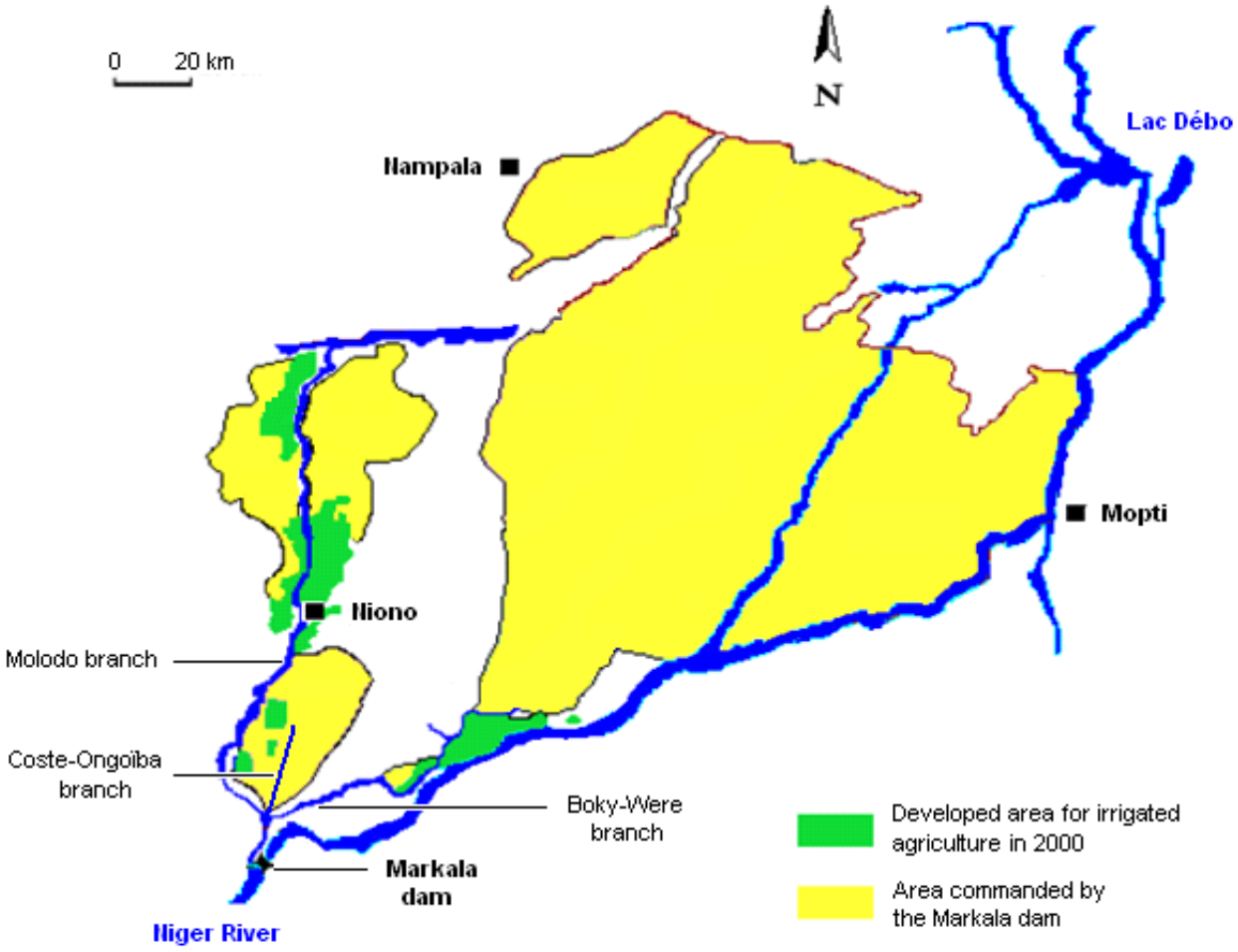
INTRODUCTION

In the wake of the 2008 global food crisis, many countries were faced with high food prices and realized their vulnerability to market volatility. Consequently, increasing the levels of self-sufficiency and food production, within their own boundaries or in other countries, became a pressing priority for these governments. Scholarly work and the international media have gradually revealed that large-scale acquisitions by private investors of land suitable for agriculture dramatically increased due to several

economic or political drivers (Cotula, 2012), stirring a debate on whether or not these investments amounted to a new instance of 'land-grabbing' (von Braun and Meinzen-Dick, 2009; De Schutter, 2011; Deininger et al., 2011; Skinner and Cotula, 2011).

Reported and documented cases of large-scale land deals in the past show particular investor interest in Africa (Sudan, Ethiopia, Mozambique, Mali, Madagascar, etc), which was supposed to still offer large areas where irrigated agriculture could be expanded. In Mali, for instance, the government opened access to land and water resources from the Niger river basin, providing procedural and financial incentives to national or foreign investors from 2006 onward. As a result, many foreign states and private companies initiated agricultural projects in the Office du Niger (ON) area (Cotula and al., 2009). The ON area in Mali includes the largest irrigated scheme in West Africa, with nearly 100,000 ha under cultivation that could potentially be expanded to cover up to one, or even two, million ha (Consultants for Development Programmes, 2004), if one considers the area commanded by the Markala dam (figure 1) and the water available in the Niger river during the flood season. The amount of available water is however debatable, as it also depends on the needs of downstream users in the inner Delta and downstream countries. Today, about 96,000 ha of land is irrigated and cultivated by family farmers, with an average area of about 3 ha per family (Bélières and al., 2011), while around 4000 ha is exploited by sugar companies.

Figure 1. Possible expansion of the ON irrigation scheme.



The arrival of new investors marked a turning point for the development of the ON area, and large plots of land were allocated to new investors over a period of less than ten years. During the 2004-2010 period, various entities – from Malian family farmers or small investors, to big national and foreign private companies – applied for land leases covering more than 870,000 ha (almost 10 times the current cultivated area), although most of them have not yet built any physical infrastructure to access irrigation water. The diversity of investors and projects is particularly noteworthy in this instance, as some investors gained access to less than 50 ha while others acquired up to 100,000 ha.

Such expansion of irrigated land obviously translates into an increase in projected water demand, but the flow of the Niger river in the dry season and the conveyance capacity of the irrigation channels are not consistent with this increase (Bélières and Kuper, 2002). Many questions thus arise: How can one design or adapt water allocation rules to these irrigated land extensions, in particular during the dry season or deficit years? What will be the water demand in these extensions, and what is the implication with regard to conveyance and distribution? How will the new dam to be built in Guinea alter water availability at Markala? What impacts on downstream areas can be expected from a massive increase in diversions to the ON? Large land allocation might actually result in water grabbing, defined by Kay and Franco (2012) as a situation "where powerful actors are able to take control of or divert valuable water resources and watersheds for their own benefit, depriving local communities whose livelihood often depend on these resource an ecosystems".

The aim of this article is to analyze the links between land and water governance in the ON area, their evolution since 1930 (creation of the scheme), and the impact of current context of large investments on access to land and water resources. Our analysis unfolds in four steps: (i) the characterisation of land and water governance and management institutions before the 2000s; (ii) a description of the crisis in the ON system, which led to the initial call for investors; (iii) an analysis of present land allocation dynamics; (iv) and a discussion on the future consequences of new land development on water issues.

This article is based on data collected in 2010 and 2011 in the ON area. Four main methods were used: (i) an analysis of archives in France and Mali in order to understand development strategies since 1919 and the management and governance configurations adopted; (ii) semi-structured interviews to establish the explicit roles, postures, and motivations of different stakeholders; (iii) ongoing analyses of the projects planned by farmers and national and foreign investors; and (iv) workshops designed to elicit and facilitate dialogue among stakeholders on current and future challenges.

WHEN ACCESS TO LAND USED TO GUARANTEE ACCESS TO WATER

Land contracts, water rights

The Office du Niger is a public administration created in 1932 under French colonial rule (Schreyger, 1984). The government of French Sudan implemented a large-scale irrigation project, which required thousands of new settlers to develop and cultivate the reclaimed lands (van Beusekom, 2002). Two ordinances from the government (in 1937 and 1955) guaranteed settlers access to the land through a title of permanent occupation, to be granted after ten years of 'good behaviour'.

The farmer settlers had to follow strict instructions regarding plot maintenance, cropping calendars, and cultivation techniques, and also had to pay a water fee for each cropping season. This fee was calculated to cover the costs paid by the ON for maintaining the irrigation scheme and delivering irrigation water, although financial support from the colonial administration remained pervasive. Though the majority of farmers cultivated their land in accordance with the requirements of the administration for more than ten years, the granting of land titles remained rare, as it was perceived by the colonial state as a threat to its power over land management and farmers' supervision. In 1958, only 15% of farmers had received a land ownership title.

After the independence of Mali in 1960, the ON continued to supervise farmers and to control rice production and marketing. However, developed land and canals progressively deteriorated, due to a lack of maintenance. Some farmers also created 'illegal' connections to ON irrigation canals to irrigate areas outside the official scheme (Coulibaly and Sangaré, 2003). These 'illegal' irrigated lands (the so-called *'hors-casiers*') gradually increased and eventually received some kind of official recognition, when a special water fee was defined for them (at a lower rate, given the poor water control).

In the mid-1980s, international donors – notably the Dutch and the French governments – supported the modernisation of some parts of the irrigation scheme, by providing new service delivery structures and improved water management. Rice commercialisation was liberalised, and farmers were given more freedom to choose their crops, cropping techniques, and calendars. In 1989, the Malian government promulgated a decree which specified the respective responsibilities of the ON, the state, and the farmers. All former modes of access to land, whether official or unofficial, were cancelled and replaced by several forms of land contracts, namely (i) official contracts for state-owned companies; (ii) ordinary long-term leases (30 to 50 years); (iii) one-year cultivation agreements; and (iv) permanent cultivation permits. Smallholder farmers were entitled to access to the two last types of contract, but the payment of the water fee remained the main condition for keeping their plots the next year. The water fee payment scheme provided farmers with a water right for unrestricted water withdrawals from the ON irrigation network (but with no certainty on the amount or timing of water availability). Farmers' access to land and water were therefore tightly linked (Aw and Diemer, 2005).

Centralised land and water management

The ON agency was initially created to plan and manage a one million ha area of flat dry lands in the command area of the Markala dam, sited on the Niger river and close to the city of Ségou. The two main responsibilities of the ON were (i) to extend the irrigated area by providing enough land, water, and funds and (ii) to ensure high levels of production through the supervision of farmers and product-processing operations.

The ON was governed by the French colonial administration from 1932 to 1960, and then by the Malian Ministry of Agriculture. On the one hand, the ON was an intermediate institution applying at the local level strategies and procedures defined by upper-level bodies. On the other, the ON enjoyed a degree of autonomy, especially for land and water management, enshrined in a decree that delegated the property of this state-owned land to this entity. Thus, the ON was perceived by farmers as a pervasive and powerful structure – allocating land and water, supervising cropping and threshing operations, providing fertilizers – that eventually punctuated farmers' lives.

The unparalleled mandate given by the Malian state to the ON was linked to the public and strategic importance of this area for national food security. The ON area was the most important production area in Mali for both rice (about 60% of national production) and sugar (100% of national production). In 1994, the ON agency underwent a thorough restructuring, as a consequence of the changes promoted by the donors since the mid-1980s. This restructuring resulted in the refocusing of its role on water and land management, and in a reduction of its involvement in crop production supervision. The bureaucratic administration turned into a more technical body in charge of specific land and water issues and was divided into three departments: (i) monitoring and extension (today, Department of Support to Farmers); (ii) dam and primary canals management (Department of Water Management); and (iii) irrigation scheme planning and land registration (Department of Land Governance and Scheme Development).

A farmer interested in receiving a plot of land had to make a request to the ON Department of Irrigation Scheme Planning and Land Registration. Land was made available as parts of the scheme were developed or rehabilitated by the ON, and generally with the financial support of foreign development agencies and donors. ON-managed land, with its own procedures and negative impacts, appeared. In

newly developed areas, some plots were allocated to non-resident holders (e.g. traders from Bamako or powerful politicians), although donors supported land development to promote family farming.

The management delegation decree considered the ON the unique manager of the Markala dam, where a share of the Niger river is diverted. The ON was also in charge of defining water allocation strategies among primary canals, while its Department of Dam and Primary Canals Management supplied water to the farmers. A restructuring of the ON in 1994 resulted in the creation of 'Parity Committees' involving both managers and farmers who were officially in charge of the management of secondary and tertiary canals, although the ON retained a central role. At the end of each cropping season, farmers had to pay water fees to the ON.

In other words, water and land management remained centralised in the ON departments. However, water delivery and land management in the ON area were different from the rest of Mali, and robustly handled by the ON, due to the strategic importance of the area for the country. The ON has therefore long been described as a "state within a state" (Jamin and Doucet, 1994).

Enough water to supply family farms

In 1919, Emile Bélime, a French engineer from the colonial services, conducted a mission to evaluate the technical feasibility of a large irrigation project in the 'dead delta' area (the upstream part of the Niger inner delta, nowadays not reached by natural floods. Figure 1 shows the two old river branches: Molodo and Boky-Were). He concluded that water could be mobilised from the Niger river during the flood season, i.e. from June to December, "to irrigate at least one million hectares of flat and fertile lands by using ancient branches of the river" (Bélime, 1922).

The flood season was therefore found appropriate for growing cotton and rice as main crops. Furthermore, the abundant water availability (between 2000 and 3000 m^3/s) allowed the management of water through gravity (without energy costs) and over-supply. Recent studies on the performance of irrigation at the tertiary level show that the system is still managed with minimal effort, which is possible when supply largely exceeds demand, by providing between 20,000 and 25,000 m^3/ha where crops need 10,000 m^3/ha (Vandersypen et al., 2006). Employees of the water management department explained in 2011 that reducing water deliveries across the ON irrigation scheme was not considered a main management objective, as their first target was to avoid discrepancies in supply between head-end and tail-end areas and local water shortages, which are important issues in the ON irrigation scheme (Zwart et al., 2010). Facing specific design constraints and public pressure, ON employees tend to manage water levels rather than water deliveries, releasing a plentiful supply during the flood season to guarantee enough water to all family farms, even if this results in lower overall irrigation performance.

In the 1980s, the ON and some donor-funded projects introduced double-cropping, whereby farmers developed vegetables to crop outside the flood/rainy season, i.e. the dry season from January to May, when the water discharge in the Niger river drops below 300 m^3/s. But a lack of oxen or sufficient mechanisation to plough the land in a short time, difficulties in accessing seasonal credit, and delays in harvesting rice at the end of the main season appeared as the main constraints to the expansion of this policy (Aw and Diemer, 2005). Thus, at the end of the 1990s, the area cultivated for rice and vegetables during the dry season remained below 20,000 ha, or 20% of the area cultivated during the flood season, while earlier studies show that about 30,000 ha was double-cropped based on the water available in the Niger river in the dry season (Sogreah, 1984). In addition, a Chinese-Malian company currently cultivates 4000 ha of sugar cane, a perennial crop that requires a substantial amount of water during the dry season. While all the sugar cane fields are served by the same primary canal, dry season rice and vegetable fields are scattered over the command area of all primary canals. This ensures a degree of spatial and social equity but requires the impoundment of all primary canals, resulting in severe losses and low overall levels of distribution efficiency. Only a few instances of water

shortages caused by a low water flow in the Niger river have been recorded (e.g. in 1999). Other shortages rather have occurred at the local level, due to mismanagement or poor water control.

PRESSURE ON THE SYSTEM AND CONSTRAINTS TO EXPANSION

Under the pressure of population growth, and the arrival of migrants attracted by the ON area, the availability of irrigated land became a major constraint. Farmers developed pluri-activity and looked for wage labour and for plots to hire from those who faced financial or technical difficulties (Coulibaly and Bélières, 2006). Others continued to develop illegal '*hors casiers*' next to the irrigation scheme.

Under the pressure of urbanisation in Mali, especially due to the growth of Bamako, the ON area also faced a food supply challenge. The ON area produced about 450,000 tons of rice in 2000, covering half of the national consumption. The yields were already quite high, with impressive shifts from 2 to 6 t/ha observed during the previous 20 years, which made it difficult to envisage significant increases in total production without developing new lands (Aw and Diemer, 2005).

Yet, financial resources to develop new land for irrigation were running out. In the 2000s, donors and foreign development agencies (France, The Netherlands, Germany, The World Bank,…), after having supported the ON for land development for almost 20 years, shifted their policy from financial support for land development to management and technical support to ON departments. Thus, the ON developed another approach, dubbed 'participatory', to share costs whereby the state would invest in main and secondary canals, while the farmers would support investments at the tertiary and on-farm levels. Nonetheless, the decrease in per capita land endowment reduced the farmers' capacity to capitalise (Bélières et al., 2002) and to make the substantial investments required for land development (about €4000 per hectare).

The ON still granted one-year cultivation agreements (Bélières et al., 2011), but ON officials realised that 'second class' types of schemes, developed by farmers themselves without official authorisation, could emerge. In addition, two syndical organizations created in 1995-96 became well-recognised by the farmers as defenders of the rights of smallholders (Couture et al., 2002). Their political weight to influence the decision-making process concerning the development of the ON area increased, thus, in the new 'participatory' approach, challenging the power of the ON regarding land management. Accordingly, the ON and the government looked for funding sources other than farmers to develop new irrigation units, with the aim of regaining authority over land management and keeping a central role in irrigation planning.

These different and combined pressures and constraints led the Malian government to launch an ambitious strategy that aimed to develop 200,000 ha of irrigated land by 2020, i.e. 5000 ha of additional land to be developed every year, or a yearly investment of €20 million (mostly expected to come from investors).

In 2006, the Malian parliament voted for a new framework law for agriculture. As donors were lobbying to give more importance to the private sector in Mali, this law promoted private and foreign investments as a new source of funding for the development of agriculture: "The [Malian] State shall take steps to facilitate the acquisition of land titles by national investors and to facilitate entering into lease by foreign investors willing to invest in Agricultural Development in Mali" (Article 82).

The call to investors mentioned that "developing an additional hectare in the ON area costs less than 4500 €, compared with other countries where it would cost about 15,000 €".[1] The government also depicted investments in the ON area as a "windfall", whereby "one hectare of developed land yields a minimum of 6 t, while allowing you to grow a second crop in the dry season",[2] affording one the "opportunity to get a ten-fold return [on capital]".[1] Likewise, official newspapers promoted the ON as

[1] www.office-du-niger.org.ml/internet/index.php?option=com_content&view=article&id=10&Itemid=9

[2] "*Quelle aubaine enfin pour vous lorsqu'un hectare aménagé vous procure en moyenne un minimum de 6 t/ha avec la possibilité pour vous de faire une deuxième récolte durant la contre saison*".

an area with "a huge potential still unexploited" (Le Journal du Mali, 2009). As the world food crisis of 2007-2008 made investments in irrigated agriculture more profitable, the government launched a second call for investors in 2008, which was circulated worldwide in a context of high food and energy prices. Though the context was favourable to an increase in national and foreign investments in the ON area, the call was launched without due consideration for the actual constraints in accessing and managing land and water.

ACCESS TO LAND THROUGH A FRAGMENTED NEGOTIATION PROCESS

Diversity of new investors

From 2005 to 2009, following the government call, various investors submitted requests to obtain leases in the ON area and presented their irrigation projects, most of which were selected by the ON. As a result, in 2009, 870,000 ha of land had entered the allocation procedure (having obtained the initial – temporary – letter of agreement), an area largely exceeding the initial overall target of 100,000 ha set by the Malian government.

Nearly 500 national investors, mostly small investors hailing from cities, were granted leases for a total of 400,000 ha. The larger part of these temporary attributions concerned areas between 1 and 50 ha. Only 3% of national investors (a total of 20) requested leases for areas larger than 500 ha, but these represented a combined area of almost 300,000 ha. These big national investors were private companies already operating in the agricultural sector, or operators newly interested in investing in agriculture. These investors planned to develop large-scale mechanised farming but often had no experience in the field.

A total of 470,000 ha was allocated to foreign investors, divided into 15 projects and each covering an area between 2500 and 100,000 ha. The origins and the objectives of these investors were diverse:

- Eight projects were initiated by foreign private firms (e.g. a project driven by a South African corporation to develop sugar cane plantations).
- Some projects were undertaken by foreign states, i.e. sovereign wealth funds, or by government-owned corporations (Libya, Saudi Arabia, China, Burkina Faso). These projects aimed to secure food and meet domestic consumption, by producing crops in Mali on large-scale plantations with wage workers.
- Two projects were initiated by inter-state organisations, CEN-SAD and UEMOA, with the latter intending to redistribute developed land to small investors and family farmers.
- One project was conducted by an international donor (the United States, through the Millennium Challenge Account – MCA – project), with the stated objective of ensuring food security in the ON area by distributing plots of 5 to 50 ha to existing and new farmers. The MCA project is therefore not an investor's project, as it comes under the category of donor-funded rehabilitation/expansion projects in the ON area. Nevertheless, it is analysed in this article because of its implications on water needs and water allocation issues.

The investors therefore cannot be considered a homogenous group of actors because they differ through geographical origins, objectives, political and economic weight, and intended production, as some plan to grow perennial crops, like sugar cane or *Jatropha*, that need a year-round water supply.

Access to land and investors' strategies

A standard procedure has been defined for investors willing to access land in the ON area. Investors must first go through the Office du Niger in order to obtain a 'letter of agreement of principle'. This letter is delivered after a preliminary field investigation by the ON, to avoid the allocation of already

allotted plots. Investors must then undertake technical studies and an economic, social, and environmental ex-ante assessment. If the ON and the Ministry of Environment validate these studies, the ON grants a 30-year or 50-year lease for the project, defined not only in terms of area, but also in terms of crops and cropping calendar that can be translated into water requirements.

Legally, the ON is the decisional and operational state service in charge of all the steps. However, the central government often bypasses the ON, and different government bodies have given provisional access to land to important foreign operators without following the standard procedure. Nearly 250,000 ha have been allotted in this way. Likewise, the MCA project received its agreement and a land title directly from the President of the Republic.

Depending on privileged personal relationships, investors initiate ad-hoc negotiation processes using different social, economic, or political networks, while foreign investors mainly negotiate with state bodies. The UEMOA (West African Economic and Monetary Union) and Malibya project (an important private company associated with the Libyan regime) signed an agreement with the Ministry of Agriculture; other foreign investors worked with the Department of Industry and Trade or with the Ministry of Housing and Urbanism (e.g. private sugar companies). National investors, rather, negotiate with regional officials. They present their project to the regional governor, or to local officials, who have political influence on the ON land allocation process. Ongoing analytical and participatory work on negotiation processes shows that the land and water allocation system involves multiple actors and is highly fragmented, with little information flowing among stakeholders.

Challenged by these centrifugal strategies, the ON has tried to recentralise land governance in order to deal with uncertainties about the total area actually allocated and to avoid a predictably chaotic situation, whereby the same land might be allocated several times. In January 2010, the ON's managing director created a team tasked with supervising new investors' projects, but its action has so far been hindered by difficulties in accessing information and by the limited recognition of its role by the other actors involved in the land allocation process. Traditional donors (World Bank, France, Netherlands, Germany, EU) have also attempted to strengthen the central role of the ON in regional planning and management through the setting up of different support programs.

In contrast, the government created a new institution to coordinate land attribution: a secretariat of state, attached to the prime minister's office, in charge of the integrated development of the ON area. In 2011, this SEDIZON became a full ministry (MDDIZON). This institution challenges the authority of the ON over land governance and bypasses its decisions. As the ON area is of strategic importance for Mali, the government has centralised the allocation process at the national level, with the SEDIZON instead of a regional – ON – level to handle economic and political issues. This re-centralisation process at the upper political level is primarily related to the government's will to re-centralise the benefits associated with land allocation to large investors (financial benefits, but also political in the case of the Malibya project).[3] The transfer of decision-making power from Ségou (ON headquarters) to Bamako (seat of the Government), could also result in less attention being paid to the technical limits of land and water allocation: land is allocated to investors, without detailed analysis of the consequences of projects, for example on water demand.

Land development and first social responses

New land allocations, mostly done without prior consultation with local people, are the subject of numerous protests from local farmers. Although the dry lands in the area are legally considered 'vacant and free of use', they are actually used for many activities such as rain-fed cropping, cattle breeding, and firewood collection, as well as for hamlet and village settlements. Thus, the settlement of new investors in these dry lands inevitably results in conflicts around natural resource sharing and dispossession, as no compensation mechanisms seem to have been planned.

[3] A similar move was observed in Cambodia, where authority over the Tonle Sap lake was re-centralized at the level of an organization attached to the cabinet after oil and gas resources were discovered under the lake (Keskinen and Varis, 2012)

For the development of the Malibya project, engineers established residential compounds, cleared working areas, and planned the main canal – all in disregard of existing villages and cattle drive trails (Brondeau, 2011). Consequently, ON departments asked for a new plan. In the second version of the plan only four villages were to be displaced instead of 16; however, dwellings and gardens close to the main canal were to be destroyed, without any compensation. The main village in the eastern part of the ON area (i.e. Kolongo) would be divided into two parts by the main canal, with consequences regarding access to basic infrastructure for villagers (school, market, town hall, health centre) coming into play. Local groups therefore garnered the support of nongovernmental organisations, and an important forum took place in Kolongo in November 2010.[4] Their mobilisation resulted in new negotiations on individuals' compensation and resettlement, but one year after the forum, only 6% had received the compensation fees announced for the houses and gardens of the residents, while no cattle breeders had been compensated.

In 2010, an important national cereal market operator – M.K. – obtained a lease for 7400 ha close to the head of the irrigation scheme. Works began without informing local people about the objectives of the project and farmers were supported by syndical organisations, although they strongly opposed this new investment encroaching on their crop land and pastures. Demonstrations took place on the site and were relayed by the local press (Malijet, July 2010).[5] The investor removed people by force but the national press denounced the use of violence, and as social unrest and pressure increased, the investor gave 1000 ha back to the villagers. Inhabitants of the largest village are now employed by the investor, whose project involves testing different cropping systems on a developed area of 400 ha and is considered by the ON and MDDIZON as an example of private investment in the ON area.

International donors have also faced opposition and problems. The MCA project, often cited as an example by the government, developed around 7000 ha of land for local small farmers while following World Bank procedures for displacement and compensation. The farmers installed were provided with accommodation, tools, and technical support, but the project also illustrates the many challenges related to land distribution. The MCA project received from the government a land title to 21,000 ha, but the project area overlapped with parts of a 1000 ha area already allocated in 2005 to a national investor. The ON was informed of this overlap and consequently reduced the area allocated to the national investor (who was facing a lack of financial resources to develop the whole 1000 ha area anyway).

Different pressures, exerted by the media and politicians, led the ON and MDDIZON revising the areas allocated to investors. In 2011, they cancelled 280,000 ha out of the 870,000 provisionally allocated, for 'non-compliance with procedures'. The main part concerned small investors, although foreign investors' projects were maintained, even if most of them had not yet been developed or had not followed procedures.

These examples highlight the first visible impacts of an uncontrolled process on land allocation that resulted in a land rush, or a land grab, for some of the actors. But the fragmented negotiation process can also lead to water access and allocation problems, which are either unexpected or implicitly occulted.

FUTURE WATER ALLOCATION ISSUES AND EMERGING STRATEGIES

The utopia of unlimited resources

Since early times, the Office du Niger has been seen as an area of abundant resources. Bélime described the area suitable for reclamation as a sparsely populated area. The availability of water, land, and

[4] www.cnop-mali.org/spip.php?article99
[5] www.maliweb.net/news/office-du-niger/2010/07/29/article,3803.html

labour (with about eight million people in West Africa) was key to the decision of the colonial administration to establish a large irrigation project to cultivate rice and cotton (Aumeran, 1939).

Between 2000 and 2004, international consultants drafted a development master plan for the ON area in order to frame the government's objective to develop new schemes. In this plan, the total area under the command of the Markala dam was estimated to cover two million hectares (Consultants for Development Programmes, 2004). Such a potential of available land for irrigated agriculture implicitly came under the purview of the ON, since its area "may be extended to all non irrigated land that government considers to be necessary to the mission of the ON" (Article 3 of the management delegation decree No 96-188/P-RM). This also meant that only 5% of the estimated available land had already been developed and that, in this master plan and in the eye of the government, available land was perceived as quite unlimited.

In 2008, the call for foreign investors by the Malian government adopted the same language and assumptions of unlimited key resources (i.e. water, land, workers), referring to the ON as an "area with a potential for gravity irrigation unparalleled in the world"[6], while newspapers emphasised that "water is a gift of heaven, and land a bonanza for the population and agricultural development" (Le Journal du Mali, 2009). The ON website contains further explicit references to "a huge surface of irrigable lands", "considerable water resources… available during the flood of the Niger river", and "numerous and inexpensive workers".[7]

Such an assumption of unlimited resources availability led to the allocation of an additional 870,000 ha in 2009. After the recent cancellation by the government of some of these provisional allocations, the total additional area under the allocation process is now 600,000 ha, i.e. six times the actual irrigated area. This obviously raises the question as to from where enough water will come. Recent studies supported by the German development bank (KfW) (AHT Group and Betico, 2011) concluded that groundwater resources in the ON may help to meet cattle and domestic needs, but they are unfit for irrigation as a main use. This was confirmed by recent research studies showing that the flow which can be expected from groundwater is limited, even if the total amount of groundwater is substantial (Tangara, 2011). Therefore, the development of new land will directly translate into an increase in the water diverted at the intake on the Niger river. While many stakeholders and experts focus on specific local issues about access to land within the ON area, issues surrounding water availability, distribution, and allocation have remained poorly addressed and mostly limited to discussions on the implications of growing sugar cane.

It is apparent that current expansion plans have not included possible implications in terms of water availability, distribution, and allocation. The hydrological regime of the Niger river is characterised by two periods: (i) from June to December (the flood season), when discharge in the Niger averages 3000 m^3/s, and (ii) from January to May (the dry season), when discharges decrease drastically (less than 100 m^3/s in March and April, one year out of five). Several critical issues concerning both the dry and the flood season are reviewed in the next two sections. The ensuing one addresses implications at the basin level and discusses what kinds of reallocation or instances of 'grabbing' might materialise.

Dry season: Looming shortages and strategic responses

During the dry season, water shortages in the ON are currently rare because double-cropping and sugar cane areas remain limited. However, things can change quickly. For instance, 40,000 ha is already allocated to two main investors to grow sugar cane, a perennial crop, which will increase water demand year-round. An ongoing analysis shows that, with only 15,000 additional hectares of sugar cane, if the water flow in the Niger river remains the same, farmers who cultivate rice during the dry season will face the high risk of a water shortage one in every three years. Thus, water supply to new users would lead to less available water for existing users, amounting to a reallocation process. This questions the

[6] www.office-du-niger.org.ml/internet/index.php?option=com_content&view=article&id=10&Itemid=9
[7] www.maliagriculture.org/services_tech/Office%20du%20Niger/page-ON.html

future water allocation policy within the irrigation scheme and priorities that need to be given to large-scale investors or family farmers, to cash crops or food crops. More importantly, the central question hinges around the way scarcity will be shared in dry years, when the issue of priority in allocation will become critical. Nonetheless, the degree of competition over water in the dry season will also depend on the final choices of each investor: what will be the area under irrigation, what crops will be cultivated, what irrigation technology will be used? The objectives of some investor-driven projects are clearly not yet known. For example, the MCA website indicates the area to be developed, the crops to be cultivated, and the farmers to be benefited, but other investors are still looking for funding or are waiting for market or political opportunities to decide what they are going to grow (e.g. a perennial or annual crop; crops with high water needs or not; double-cropping or not).

Even if future water demand in the dry season remains uncertain, the ON and investors are aware of the limited amount of water available, so they have started to consider several technical, economic, and institutional responses and strategies.

The ON has, in particular, promoted the shift from rice to field crops and vegetables (Traoré, 2008). Family farmers who engage in double-cropping are encouraged to grow vegetables, which need less water, instead of rice during the dry season. In the 1980s, donors prompted the use of water fees as an incentive to expand double rice cropping. The water fee for vegetables was at this time higher, as market gardening was considered more profitable, but in 2010, the ON reversed its policy and reduced the dry season water fee to incentivise farmers to crop vegetables, which require less water per hectare than rice. The water fee for one hectare cropped with rice is now ten times that for one hectare of vegetables.

Investors have looked at technical options to reduce water consumption; for instance, companies cultivating sugar cane have adopted new techniques, such as sprinkler irrigation, to reduce water consumption at field level by using pumps to mobilise water from primary or secondary canals.

The US-funded MCA project has developed an institutional strategy. The MCA has proposed to create a new institution to ensure the sustainability of its project after funding ends. As currently defined, this institution would be an agency with financial autonomy that would manage the 22,200 ha area granted to the MCA. Furthermore, a new Supervisory Control and Data Acquisition (SCADA) system that monitors water levels and water withdrawals at the intake of each secondary canal on the Molodo branch has been developed by the MCA. The agency will also supervise this system in an attempt to ensure that water supply meets the water requirements of the MCA area that is located downstream from the Molodo branch (figure 2).

Other investors have developed strategies based on (sometimes 'behind closed doors') negotiations to secure access priority by following several strategies. First, several large investments in the ON area have signed written agreements. In 1998, a Chinese-Malian company for sugar cane development made an agreement with the ON to ensure that the ON's water management department would "supply the suitable amount of water for irrigation on the basis of an irrigation schedule prepared by the company". This agreement also set the terms of the total water fee to be paid by the company at about 2000 FCFA/ha (i.e. 3 €), instead of 67,000 FCFA/ha (i.e. 100 €) for family farmers who crop rice. The ON justifies this difference in water fees through the financial investment made by investors to develop land, to dig canals, and to maintain infrastructures. In 2007, a South African company signed an agreement to ensure a minimum year-round delivery rate of 20 m^3/s, and in 2008, Mali and Libya signed an agreement on land and water access for the Malibya project: "[t]he Republic of Mali is committed to deliver un-restricted licenses to the project to use water from the Boky-Were branch to meet the project's water demand".

A second strategy followed by investors is the strengthening of political and social networks. Some Malian investors have developed strong relations with ministries and ON officers in order to increase their influence on the decision-making process and to ensure priority access to water, or the granting of land in the upstream reaches of the scheme. These pacts can be considered as non-written agreements.

These 'grab-it-first' strategies, or 'blue rush', are akin to those described by Molle (2008) worldwide at the river basin level. The denial of basic hydrologic realities, even when these are quite straightforward to even a layperson, is a quite common attitude that allows the justification of a project (and the realisation of associated short term-benefits) while relegating contradictions and induced conflicts to others and to the future. Tantamount to burying one's head in the sand, such ostrich-like policy attitudes are also common in situations where conflicts between cities and agriculture are solved by a project (dam, transfer, wells) that often amounts to a (covert) reallocation of water out of agriculture (or the environment) to cities (see Molle and Berkoff, 2009).

Flood season: Hydraulic inconsistencies

During the flood season, the water available in the Niger river is theoretically enough to irrigate one million hectare, but actual water withdrawal depends on the maximum conveyance capacity of the irrigation network, especially the main canal (or feeder) connected to the river. Water flows by gravity from the river to the feeder canal, which has no intake structure and a current maximum conveyance capacity of 180 m^3/s. With a maximum withdrawal of 180 m^3/s, and considering actual irrigation efficiency and the existing 4000 ha of sugar cane area, our calculations show that about 160,000 ha of rice could be cultivated at the same time, without risking water shortages in the flood season, which is much lower than the 600,000 ha already allocated.

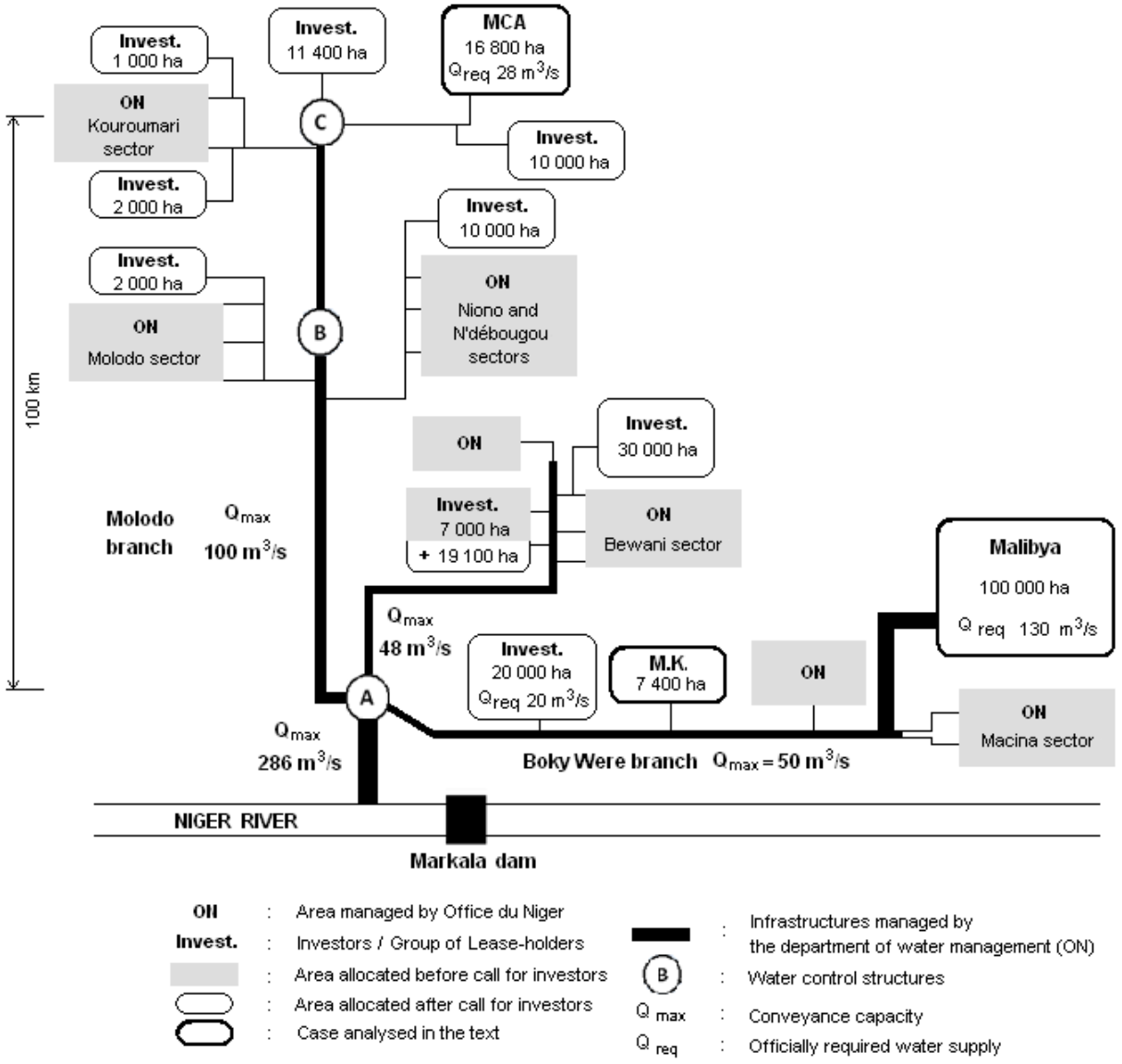
To make matters worse, the erosion of primary canal embankments is widespread, and rain and dike failures sometimes cause uncontrolled overflows, which are events closely monitored by politicians at the regional and national levels, as they might be an important risk for existing crops and villages downstream and for lands ready for development. The risk of overflow is therefore a major constraint for the ON, but other constraints for water management are surfacing as individual planning by some investors results in new hydraulic inconsistencies.

Field work conducted in 2011 allowed us to sketch out the ON irrigation scheme in the future, considering the location of land allocated to investors, or groups of investors, and hydraulic connections with primary canals, as known at the end of 2011 (figure 2). For land expansion, the irrigation scheme will become denser, with more connections and longer canals, thus creating new challenges for the manager to allocate water equitably in time and space across the scheme. Hydraulic, locational, and topographical inconsistencies have already appeared and illustrate some of the water allocation issues that are likely to become prominent in the future, as more water is mobilised from the Niger river in the flood season.

The Malibya project is probably the most famous case of new land development in the ON area. A total of 100,000 hectare was allocated to Libya by the Malian government on the eastern border of the ON area, downstream of the Boky-Were branch. A study was conducted in 2007-2008 to estimate the technical feasibility of such a project. To convey enough water by gravity, Libyan engineers and a Chinese company dug a 120 m-wide canal at the end of the Boky-Were branch, with a conveyance capacity of 130 m^3/s. The upstream old Boky-Were branch (50 km) was already being used by the ON as a primary canal to supply water to a production area of 19,100 ha (with corresponding maximum water diversions of about 40 m^3/s, for a maximum conveyance capacity of the branch of 50 m^3/s). The new canal would have two major consequences on water sharing issues – at both local and regional levels. The intake of the Malibya canal is located less than 100 m away from the ON secondary canal intake, so a large opening in the Malibya canal would affect the water level next to the ON automated gates. Some problems have indeed already occurred, so the Malibya project and ON departments held a technical meeting in May 2010, resulting in a new procedure which allows Malibya to open its gate only when the water level in the Boky-Were branch is above a given height. This canal also has implications at the upper level. To avoid overflows, the actual conveyance capacity of the Boky-Were branch is maintained under 50 m^3/s. Therefore, the maximum conveyance capacity of the Malibya canal cannot be reached without big investments to enlarge the upstream canal and without negative impacts on ON

farmers' water supply (as described earlier). This illustrates the hydraulic inconsistencies of a project of high political importance, conducted to herald the effectiveness of the Mali-Libya partnership (which is now uncertain given the recent events in both countries).

Figure 2. Possible future water users and conveyance capacities of the main canals (data from a field study conducted in 2011).



M.K., the Malian investor mentioned previously above, received a lease for the head end of the Boky-Were branch (figure 2). A consultant hired by the investor emphasised that this location, upstream of the Malibya project, would help to secure adequate supply. M.K. purchased earth-moving machinery and modern centre-pivot irrigation equipment and became an example of private investment and 'modernisation' in the ON area. But during the first crop year in 2011 (when less than 200 hectare was actually irrigated), several mishaps occurred and contradictions appeared. Fundamentally, the water level in the Boky-Were branch remained too low to allow water to flow into the investor's canal, which happened for two main reasons. First, the area allocated to the investor was considered unsuitable for irrigation by gravity (and had been considered as such during Bélime's exploration in the 1920s)

because of its high topographic level and sandy soils. However, and second, the ON department would not increase the water level because of the high risk of flooding downstream villages and irrigated areas. This oversight regarding the topographic constraints of the ON area led the investor to find new solutions (i.e. pumping directly in the Boky-Were branch) with negative financial consequences (e.g. costs for works, equipment, and electricity or gasoil).

The MCA also had to deal with hydraulic inconsistencies. Its area of 22,200 hectares was located downstream the Molodo branch, which already supplied water to about 70,000 ha. With these existing areas, the conveyance capacity of the branch (100 m^3/s) did not allow the MCA's area to meet its water demand for 28 m^3/s. Nevertheless, and in contrast to the Libyan and M.K. projects, the MCA started to address water issues at an upper level and planned large works on primary canals. Consequently, contractors widened the main canal upstream of the A point to increase its conveyance capacity from 180 to 286 m^3/s, raised the dikes of the Molodo branch, and resized the main water control structures.

Possible impacts at the river basin level

The increased water supply to newly developed land might also play out at the river basin level. Whether the water available for the ON area is sufficient depends on the season considered, and on how allocation rules are defined or implemented at the basin scale, because the Niger river is 4184 km long, is used by about 100 million people, and traverses nine countries that are part of the Niger Basin Authority (ABN).[8]

In the dry season, the ABN does not allow the ON to divert all the water available upstream of the Markala dam, and the ON has to let at least 40 m^3/s flow through the dam for downstream users. The inner Niger river delta is a natural flood plain (Brunet-Moret et al., 1986) of about 40,000 km^2, with a population of about 1 million. It is an area of high ecological value and a place of numerous livelihood activities for fishermen, farmers (between 50,000 and 130,000 ha cultivated with deep water rice), and herders (2 million cattle heads) (Kuper et al., 2003). The ON, which manages the Markala dam and thus controls the flow to the inner delta, has to pay special attention to not curtailing the water used by downstream villages and countries for their domestic consumption, irrigated, or flood agriculture. The ON already withdraws between 70 and 80% of the water from the Niger river in the dry season and has limited leeway for increasing diversions (BRL, 2007).

Increasing the water supply would minimise conflicts or restrictions and is therefore favoured by decision-makers, but this option could partly increase other tensions. The water available upstream of the Markala dam depends on the management of the only major upstream reservoir, the Sélingué dam in Mali, which is the main source of electricity for the southern part of Mali and Bamako and also supplies water to irrigation schemes (a total of 4000 ha). By increasing the discharge in the Niger river in the dry season, when Bamako needs more power and the turbines are fully operating, Sélingué adds on average 100 m^3/s to the natural dry season flow at Markala (Kuper et al., 2002). Thus, the dam has a positive impact on the water available for the ON in the dry season, even if the dam is primarily managed for hydropower purpose. A new dam is planned on the Niger river, at Fomi, in Guinea, with a capacity of 6 million m^3 against 2 million m^3 for Sélingué (BRL, 2007). In 2011, the director of the ON Department of Water Management estimated that around 200 m^3/s would be added to the discharge at Markala in the dry season. However, the consequences of Fomi on the Niger river regime are still uncertain, since the way it will be managed for its different possible uses (electricity, agriculture, domestic uses, navigation) has not been defined yet and because Fomi will be built in Guinea, not in Mali. Studies on the Senegal river highlight how a new dam can disrupt and impact negatively on human activities and ecosystems (Magrin et al., 2009). To ensure the positive contribution of Fomi to the development of irrigated agriculture in the dry season, management rules should be agreed upon between Guinea, Mali, and Niger through a transboundary organisation.

[8] www.worldwaterforum6.org/en/news/single/article/niger-river-basin-nine-countries-make-commitments/

In the flood season, the discharge in the Niger river is about 3000 m^3/s, and actual diversions by the ON represent less than 10% of the total water flow at the Markala dam. Although water seems plentiful, an increase in the supply to the ON area would also have significant consequences on downstream areas, as it would clip the peak of the flood that is key to ecosystems and human activities (Zwarts et al., 2005; Marie et al., 2007). The clipping of the flood peak would reduce the number of natural depressions filled with water (Kuper et al., 2003) and the total flood water spreading area, impacting directly on the productivity of local fisheries and natural fodder production (*bourgoutières*). The future quantitative impacts of developing the ON irrigation scheme and upper-basin dams on the Niger river regime and on downstream areas are still to be fully analyzed. The ABN, which is tasked with transboundary water management, should be given a stronger role in identifying and quantifying these impacts.

In sum, larger diversions made by the ON would reduce the likelihood of reallocation/water grabbing by new developed land within the irrigation scheme. However, in both the dry and flood seasons, supplying more water to the ON area would result in a reallocation process at the river basin level, while the downstream benefits associated with the current water regime would be disrupted and decreased.

CONCLUSION

Favourable international, national, and regional conditions have allowed the Office du Niger to launch a process of expansion and new land allocation by attracting investors. Although, before the 2000s, the ON was the central institution for regulating access to land and water, it has often been bypassed by new investors, who have obtained land leases without following standard procedures. This has led to a fragmented negotiation process, whereby different investors have used different networks in the administrative and political apparatus in order to secure both suitable land and water arrangements. Large areas have been rapidly allocated to investors all over the ON area, with a total of 600,000 ha – i.e. six times the current cultivated area – allocated to 35 major investors and more than 500 smaller ones.

This context of negotiation outside the formal framework limits the dissemination of information among stakeholders and overlooks future water management issues. However, poor information flow and the lack of an integrated regional approach may also suit some powerful actors at the regional or national levels, who want to preserve their capacity as brokers to benefit from land deals. The creation of a new ministry in 2011 (MDDIZON) can also be interpreted as a move to re-concentrate at the highest level the power to administrate land deals and their associated benefits. The ministry allocates land on political and other grounds rather than on technical considerations. ON experts (former directors, some consulting companies, etc) and 'traditional' donors (foreign development agencies) understand the contradictions attached to land allocations, but they are not key decision makers and have somehow been sidelined.

Hydrologic realities and natural limits are not adequately considered and contradictions have started to surface. Competition for water in the dry season is likely to rapidly become a source of tension, notably in deficit years when the question of priority will become critical. In the flood season, the nominal discharge in the Niger river may be enough to irrigate several thousands of hectares, but the technical constraints of managing such a large scheme are not yet understood. Emerging issues such as canal conveyance capacity, limitations in water levels, the location of new lands (i.e. high and sandy lands, or at the tail end of long canals), or protests by local populations are foreshadowing the conflicts that are bound to arise in the near future.

Furthermore, they also signal that accessing land does not mean accessing water. Investors (even if investments are not always visible on the field) have deployed different strategies to negotiate priority access to water in order to avoid or limit the likelihood of water shortages in the future. Some investors have obtained written official commitments, others have used their personal connections in

administrative or political networks, while the MCA has proposed the establishment of a new organisation that would try to monitor and ensure the fair allocation of water on the Molodo branch. Meanwhile, the ON has encouraged a shift from dry season rice cultivation towards vegetables, while some investors have adopted water-saving irrigation technologies.

Self-serving optimism has also entertained the vague hope that the construction of the Fomi dam, on the Niger river in Guinea, would solve the problem of water availability. While the dam is likely to increase flow and alleviate tension in the dry season, it will clip the flood peak and impact the livelihoods of populations living in the inner delta and further downstream that depend on fisheries, flooded rice, flood recession agriculture, or pastoralism, all benefits that are basically proportional to the magnitude of the flood. This would obviously be compounded by massive diversions of the Niger to the ON during the flood season, especially in deficit years, if all the land allocated were to be irrigated.

This leads us to postulate whether planned land development at the Office du Niger is likely to result in water grabbing, whereby water allocated to new investors would directly or indirectly translate into reduced allocation to other users within and downstream of the ON area, and reduce their water-based livelihoods. Despite the uncertainties on what will be the effective rate of land development, and how the Fomi dam will be managed, there are important concerns, namely water shortages in the dry season (even with the Fomi dam), uncertainties in supply, head-end/tail-end discrepancies and associated shortages, and downstream impacts in the flood season. All these concerns point to the spatial and social redistribution of benefits and costs associated with the modification of the water regime.

There is an obvious need for a more integrated approach to both ON area development planning and development at the Niger basin level, but as long as access to land and water is negotiated through fragmented processes, issues of water allocation and overall land planning will remain unaddressed. It might be difficult to propose a 'code of conduct' for water grabbing, as Borras and Franco (2010) did for land grabbing, because of the prevailing 'ostrich-like' strategies that serve short-term private interests and disregard the necessity to consider long-term strategies and move towards a new perception of water as a scarce resource. The involvement of all actors, including those who are usually not represented in negotiation processes (e.g. family farmers or downstream users), in the definition of future rules of water allocation is a major issue. Involving concerned stakeholders is the objective of an ongoing participatory approach that aims at developing social learning through a formal framework that address long-term water issues in the ON.

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